4.9 Browsing Data with EOSView

What is EOSView?

EOSView is a Hierarchical Data Format (HDF) browse and display tool that allows scientists to preview images, tables, and text before requesting data. This tool enables EOS data product users to view the contents of HDF files and individual objects by reading and displaying all metadata fields and data objects appropriately. Supported record types for viewing and display capability include images, Raster images, multidimensional arrays, text, tables, (called Vdatas) and Vgroups. Users can also view attributes and annotations. EOSView users will see the underlying HDF structures and will be prompted for which parts of the structure they wish to view.

In a future release, EOSView will be able to convert HDF and HDF-EOS data files to a particular type (e.g., generic HDF files, ASCII, binary) for storage on a user's disk space so that the user can then make further use of analysis and visualization tools already available in commercial and public domain systems. EOSView will then be able to open and provide the means for ingesting HDF and HDF-EOS files into other software systems.

This guide equips the user to understand the user interface and functionality of the tool. A cursory understanding of Hierarchical Data Format (HDF) is recommended though not required. More information is available on HDF and HDF-EOS structure as well as the following:

- Downloading and Installing EOSView

- User Feedback for EOSView

- EOSView User Interface

Overview of HDF and HDF-EOS

The ECS Project selected Hierarchical Data Format (HDF), a general scientific data format that supports raster, text, array, and table type structures, as the format for EOS standard product distribution. The files are self-describing and portable to most UNIX systems. HDF data structures are implemented with a software interface supplied by the National Center for Supercomputing Applications (NCSA). HDF has been extended by the ECS Project to focus conventions for writing EOS data products. These extensions, called HDF-EOS, are described below.

EOSView has been designed to supply the user with the capability of opening and inspecting the contents of an HDF-EOS or HDF data file. The tool provides producers and users of EOS data the ability to navigate through HDF-EOS and HDF files, display metadata, file directory information, and data in table and/or image form.

An HDF file consists of a directory, and records pointed to by that directory. Each directory entry consists of fields for the record type (TAG), a unique ID number (REF), and a location and size of the record pointed to. All locations in the HDF file are in byte locations from the beginning of the file. All record sizes are also specified in bytes.

Supported record types include images, multidimensional arrays, text, tables (known in HDF as Vdatas), and so on. One record type, known as Vgroup, lets the user group a series of records into a larger structure, similar to disk directories.

Most NCSA defined datatypes map well to EOS datatypes. Examples include raster images, multi-dimensional arrays, and text blocks. There are other EOS datatypes, however, that do not map directly to NCSA datatypes, particularly in the case of geolocated datatypes. Examples include projected grids, satellite swaths, and field campaign or point data.

To bridge the gap between the needs of EOS data products and the capabilities of HDF, the ECS Project developed extensions of HDF, which standardize the conventions for writing HDF files, and are called HDF-EOS. These extensions allow creating Grid, Point, and Swath data structures. The software interface for the HDF-EOS implementation is very similar to the HDF interface.

The Point interface supports data that has associated geolocation information but is not organized or well defined spatially or temporally. The Swath interface is tailored to support time-ordered data such as satellite swaths (which consist of a time-ordered series of scanlines), or profilers (which consist of a time-ordered series of profiles). The Grid interface is designed to support data that has been stored in a rectilinear array based on a well defined and explicitly supported projection.

Structure of an HDF-EOS

An HDF-EOS file is any valid HDF file (i.e., any file created by the NCSA HDF library) that contains a family of global attributes called "coremetadata.X", where ".X" is a sequence number beginning at 0 and running as high as 9. Optional data objects that may appear in an HDF-EOS file include, another family of global attributes called "archivemetadata.X" and any number of Point, Swath, and/or Grid data structures. The existence of Point, Swath, or Grid structures in an HDF-EOS file implies the existence of another family of global attributes called "StructMetadata.X".

These terms are defined below.

Core Metadata

Core metadata represent information that will be used to populate searchable tables within the structure. These metadata are contained in the "coremetadata.X" (X= 0,...,n) family of global attributes within an HDF-EOS file. The syntax of these metadata is compliant with the Object Description Language (ODL). Tools for formatting, accessing and writing core metadata are provided in the ECS Science Data Processing (SDP) Toolkit.

Archive Metadata

Archive metadata represent information that, by definition, will not be searchable. It contains whatever information the file creator considers useful to be in the file, but which will not be directly accessible for the system. These metadata are also accessed via SDP Toolkit calls and are written in ODL syntax into the "archivemetadata.X", (X=0,...,n) family of global attributes.

Structural Metadata

Structural metadata describe the contents and structure of an HDF-EOS file. These metadata are present in the file only if the HDF-EOS library has been invoked to create a Grid, Point, or Swath structure. These metadata are stored in the "StructMetadata.X" family of global attributes and are created and maintained by the HDF-EOS library. These metadata are not intended to be directly accessed by data producers or users. Therefore, all access to these metadata should be via appropriate function calls in the HDF-EOS library.

Point Structure

Point structures are implemented in HDF-EOS files as a hierarchy of Vgroups containing several Vdatas, i.e., tables. All Vgroups and Vdatas that are part of any Point structure carry the class "POINT". Each level of data within a Point structure is implemented as a single Vdata, with each data field being a named field in the Vdata.

Swath Structure

Swath structures are implemented as a hierarchy of Vgroups containing a number of Vdatas and/or SDSs, i.e., tables and multi-dimensional arrays. All Vgroups and Vdatas that are part of any Swath structure carry the class "SWATH". Each one-dimensional field is implemented as a named field within its own Vdata. One-dimensional fields that are the same length, are merged into "communal" Vdatas, with each data field occupying one field in the Vdata.

Each multi-dimensional field is implemented as an SDS. Three-dimensional fields which share the same dimensionality, dimension sizes, and data type and which are specifically allowed by the calling program are merged into communal SDSs with three dimensions. Two-dimensional arrays are merged as if they were three-dimensional arrays with a first dimension of size 1. No merging is performed on fields with more than three dimensions, on fields with an unlimited dimension, or on compressed fields.

Grid Structure

Grid structures are implemented as a hierarchy of Vgroups containing several SDSs. All Vgroups that are part of any Grid structure carry the class "GRID". Each data field within a Grid structure is implemented as a single SDS. Merging is done the same way for Grid data fields as for multi-dimensional Swath data fields.

4.9.1 Downloading and Installing EOSView

You may Download EOSView through your web browser at the URL:

http://edhs1.gsfc.nasa.gov/ftp/hdf_eos

To receive the password, please email pgstlkit@eos.hitc.com

The following directories should be displayed:

- dec/

- hp/

- ibm/

- sgi/

- solaris2.3/

- solaris2.4/

- source/

A README file will also be provided in this directory. If you prefer to view the EOSView source code, change to source/directory, and download the file eosview.source.tar.Z. To download a binary version of EOSView, select the appropriate directory. Create a new local directory if necessary. Download the following four files:

1. EOSView (executable)

2. eosview.csc (help)

3. eosview.uid (user interface description file)

4. eosview.dat (IDL commands file)

To start EOSView , at the command prompt type: EOSView

The environment variables must be set as follows:

UIDPATH--location of the eosview.uid file that contains a description of GUI objects

HELPDIR--location of eosview.csc (hypertext on-line help file) and eosview.dat file (idl commands) ECS_HOME--directory for File Selection dialog to begin

If not, the current working directory must contain the four EOSView files.

4.9.2 EOSView User Interface

The following table summarizes the common functions you can perform with EOSView:

Table 4-3.   Common EOSView Functions

Function	Command, Script or GUI	Description
Display HDF file contents	EOSView file contents window	Looks at data file images, metadata, and auxiliary information
Display raster image	Image display window	Displays browse images, geolocated maps, etc.--includes multiple zoom features in image display, pan feature, and multiple palettes
Animate raster image	Animation window	Presents in order images as they appear
Display of SDS data in table	SDS data table, Vdata table	Displays a one or two dimensional list of data in a scrollable list
Expand a Vgroup	Select Vgroup from File Contents Window	Vgroups are logical groupings of information, such as Vdata, SDS data, and images
Display pseudo-color of SDS data	Image Display Window	Converts data into a visual image
Display text objects	Text Attributes Window	Describes the types of data strings for an individual object or for an entire file
Hypertext help	Online Help	Online Help is available form all menu bars
Swath/Point/Grid interface (HDF/EOS)	File Contents Display window for swath, point, and grid objects	View HDF-EOS objects at a high level (data types cannot be broken down)
Plot Vdata	EOSView Plot Window	Static line plot display of x and y data (from a Vdata table)

4.9.3 Using EOSView

Get Started

To invoke EOSView, type the following command at the UNIX command line prompt:
EOSView

The following screen will appear:

Figure 4-14. Main

From the File pulldown menu, you can select

- Open-which will pull up the File Selection dialog

- Open Animation--This option is not yet functional in EOSView.

- Exit-to exit EOSView

From the Window pulldown menu, you can select an EOSView window and have the focus change to that window as long as it is currently open.

From theHelp pulldown menu, you can select help on context, on help, on window, keys, contents, index and version.

4.9.4 EOSView File Selection

When you select Open from the EOSView File pulldown menu, the following screen will appear:
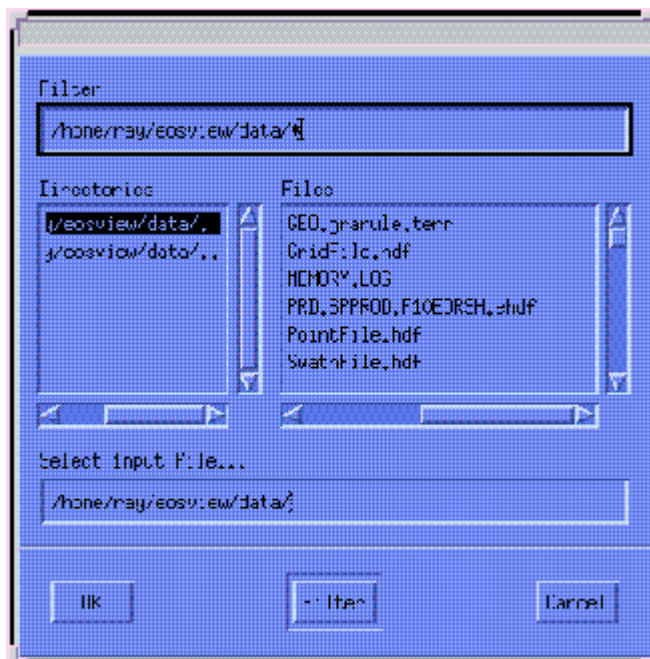
Figure 4-15. Open Window

This is a standard file selection dialog box that lets the operator search through directories and select an HDF file.

The following table explains the fields.

Table 4-4.   Field Descriptions

Field name	Data type	Size	Entry	Description
Filter	system generated (can be edited)	Unlimited	required	displays file selection parameters to filter the directories
Directories	selection	unlimited	required	displays a list of directories
Files	selection	unlimited	required	displays a list of files to select from
Select Input File	system (can be edited)	unlimited	required	displays the filename selection

In addition, the three buttons at the bottom of the display are:

1. OK - opens the specified file

2. Filter - filters through the directories in layers until the desired directory/file is displayed

3. Cancel - closes the file selection dialog

You may use the Filter button to filter through directories to find the one you need. Then from the Directory field, click on the appropriate directory. The files within that directory will be displayed in the Files field. Highlight the file you wish, then click OK.

Or you may double-click on the file. In either case, the filename you request will appear in the Select input file . . .field.

Alternatively, you can manually enter the Directory you need in the Filter field or the specific file you need in the Select input file . . . field.

4.9.5 EOSView File Contents

When you've selected an HDF file from the File Selection Screen, the File Contents Window for that file will appear.
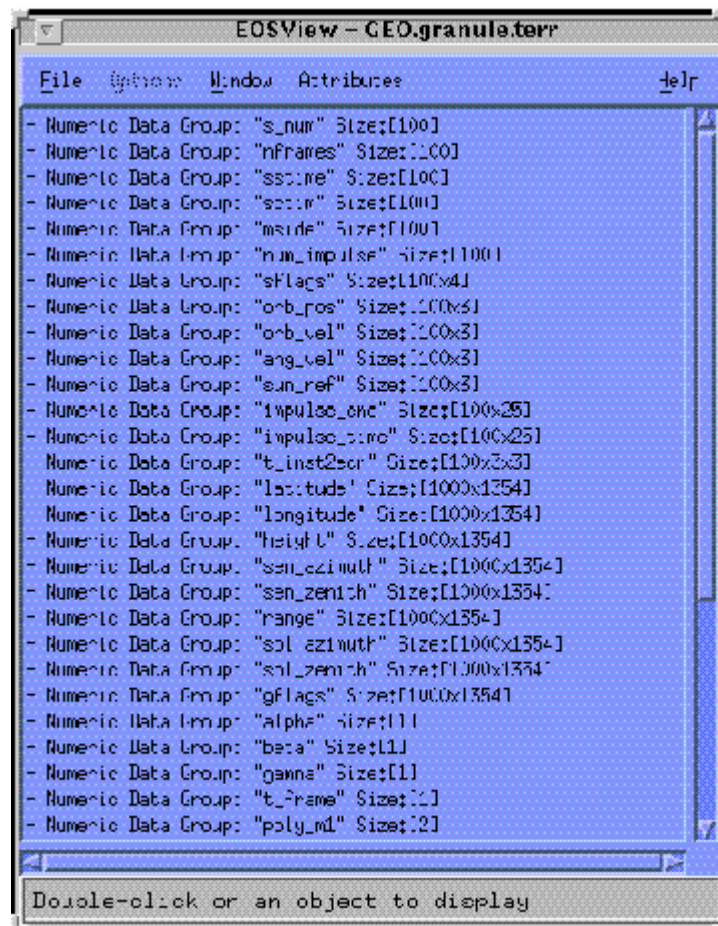
Figure 4-16. File Contents Window

This is a scrollable window with the following menu items:

The File pulldown menu provides additional information about a file and provides a way to close the file.

The Options pulldown menu and its Animate images selection becomes sensitized when the selected file contains multiple Raster Image Groups. This will cause all the images to be lined up and displayed in order in an EOSView - Animation Window. From the Window pulldown menu, you can select an EOSView window and have the focus change to that window as long as it is currently open. From the Attributes pulldown menu, you can view the global attributes for the selected HDF file. From the Help pulldown menu, you can select help on: context, help, window, keys, contents, index and version.

To select an HDF object, double-click on the object that is displayed in the scrollable window. Objects can be Numeric Data, Vdata, Vgroup, Raster Images, or Grid / Swath / Point data.

4.9.6 Building an Image

You can build a pseudo-color image from the data displayed in the Table. The image can be created by selecting File - Make Image from the menu bar of the EOSView - Table Window. Selecting this option causes the Min/Max Values window to appear.
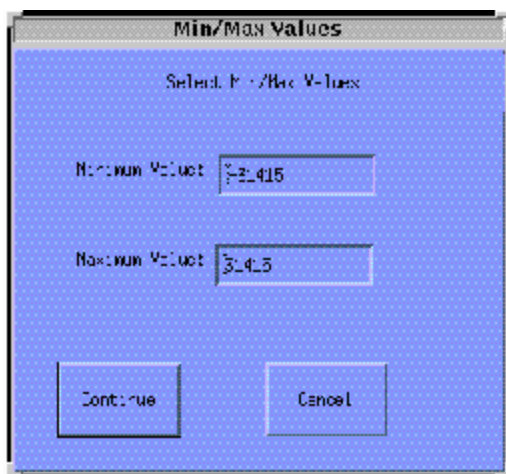

Figure 4-17. Min/Max Values Window

From the Min/Max Values Window, you can enter the minimum and maximum values used for theimage.

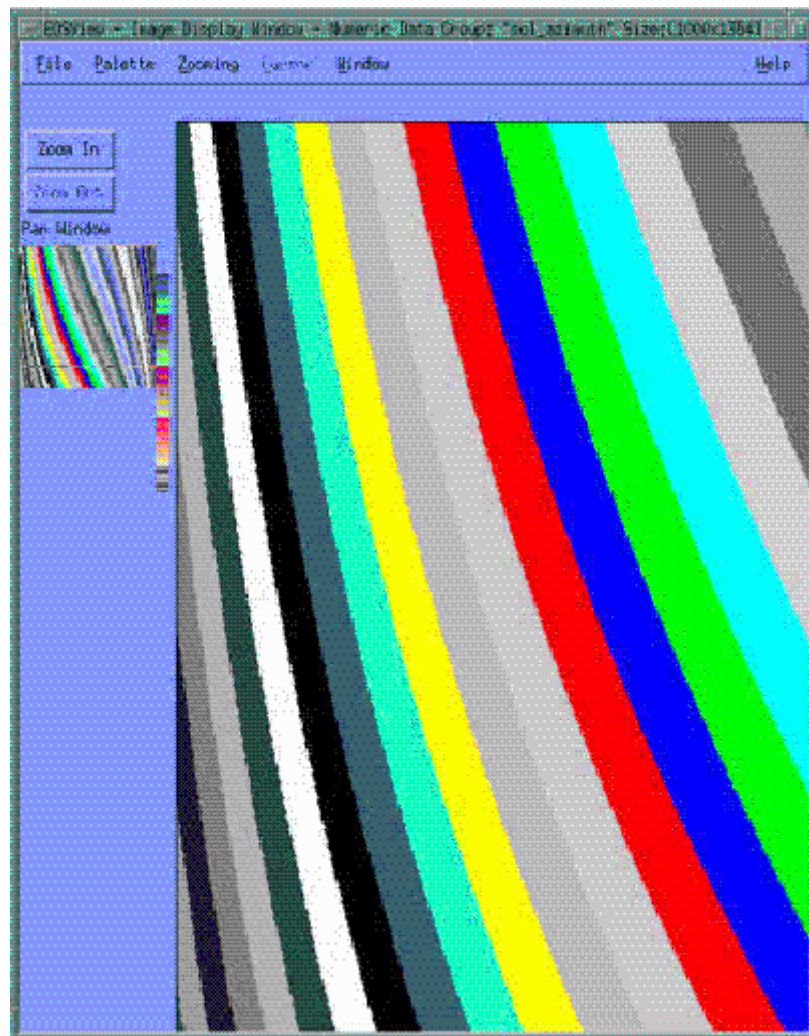Press the Continue button for the EOSView - Image Display Window to appear.

Figure 4-18. Image Display Window

You may cancel all actions by pressing the Cancel button.

Manipulating the Image

The Image Display window has the following pulldown menu options: File, Palette, Window, and Help.

Select the File, Overlay option to cause a standard set of lines to be displayed over the image currently being displayed in the Image Display Window. Select the Close option to exit the Image Display Window.

The Palette pulldown menu allow you to select colors from the following types of palettes for comparison: Default, Greyscale, Antarctica, Rainbow, and World Colors.

1. The first palette option is "Default," which is the palette provided within the HDF file of the image being displayed; if the palette was provided, the default color map is used

2. The second palette option is "Grayscale," which will be a black and white version of the image being displayed.

3. The next three options are "Antarctica" "Rainbow," and "World Colors." These three palettes are provided as part of EOSView. Selecting one of these three palettes will cause the current image to use that respective palette. The "Use entire palette" option is not functional.

The Zooming pulldown menu allows you to select from two zoom methods: Bilinear Interpolation and Nearest Neighbor. Bilinear Interpolation uses interpolation to calculate the probable color during an expansion/compression event; it gives a much smoother image during zooming. The second is Nearest Neighbor, which uses sub-sampling or super sampling to determine probable color, e.g., two red pixels are now four red pixels during expansion. The Window option lists in a pull-down menu all windows which are currently open. Opens any window selected.

From the Help pulldown menu, you can select help on: context, help, window, keys, contents, index and version.

The Image Display also has the following buttons: Zoom In and Zoom Out. It also has a panning feature as described below.

Zoom In and Zoom Out -- pressing the Zoom In button causes the image to be zoomed in and redrawn in the image window. Pressing the Zoom Out button will cause the image to be zoomed out until it returns to original size. The zoom factor will be displayed in the bottom right of the EOSView - Image Display Window on the status bar.

Pan Window -- If the you have zoomed in on an image, you may pan around the image by clicking the left mouse button while the cursor is in the postage stamp size image and moving the mouse. The cursor will be outlined by a box that indicates the portion of the image being displayed in the full-size image window.

4.9.7 VData Objects

If you select a Vdata (tables) object from the File Selection dialog, you'll bring up the Vdata File Contents Window.
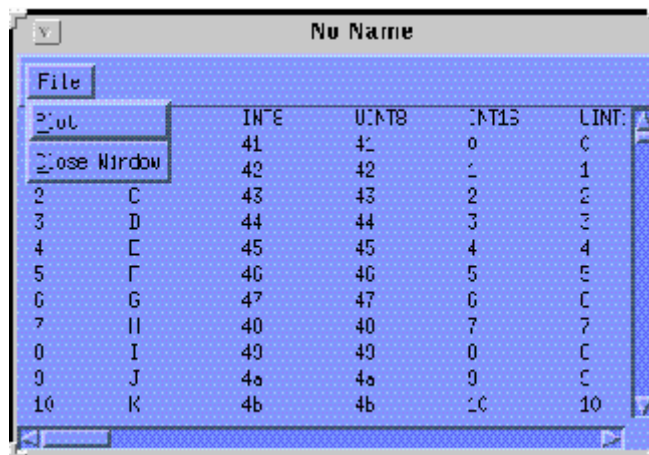

Figure 4-19. Vdata File Contents Window

In this example, the packVdata1.hdf file was selected.

Note that as of Version 2.3 EOSView will have a new Vdata interface. The User's Guide will be updated to reflect these changes at a later date.

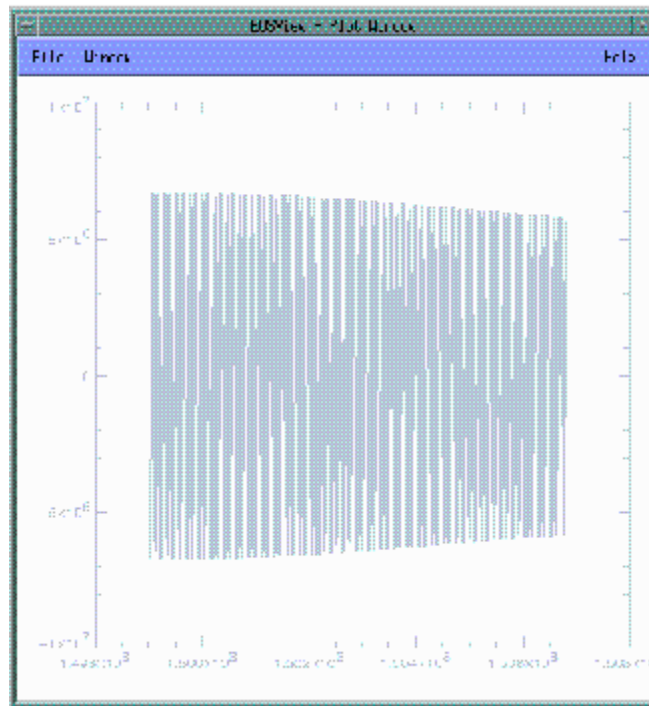Double-click on the Vdata entry to bring up the chosen Vdata table

Figure 4-20. Vdata Table

From the Vdata table, the table data is visually depicted in plot form instead of an image. When you select Plot, the Plot Window pops up.

Note that as of Version 2.3 EOSView will have a new Plot interface. The User's Guide will be updated to reflect these changes at a later date.

Figure 4-21. Plot Interface

4.9.8 VGroup Objects

If you select a VGroup object in the File Contents Display Window, the contents of the VGroup will be added to the list; then the list will be redrawn in the list box. (Remember that a Vgroup is a series of records organized into a larger structure similar to disk directories.)

If you click on a VGroup that has already had the contents expanded, the contents of the Vgroup will disappear, and the list will be redrawn in the list box.
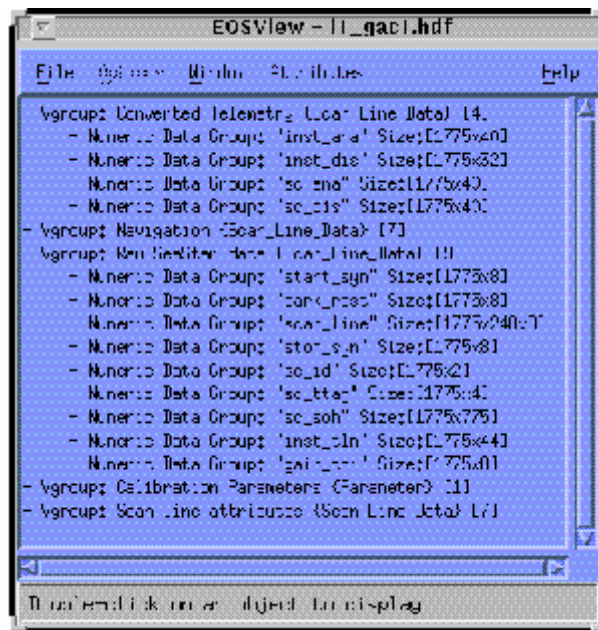
Figure 4-22. File Contents Display Window

The example shows several expanded and unexpanded Vgroup categories.

4.9.9 Raster Image

If you select an HDF file containing an image file object in the File Selection dialog, you'll bring up a File Contents Display Window like the one below.
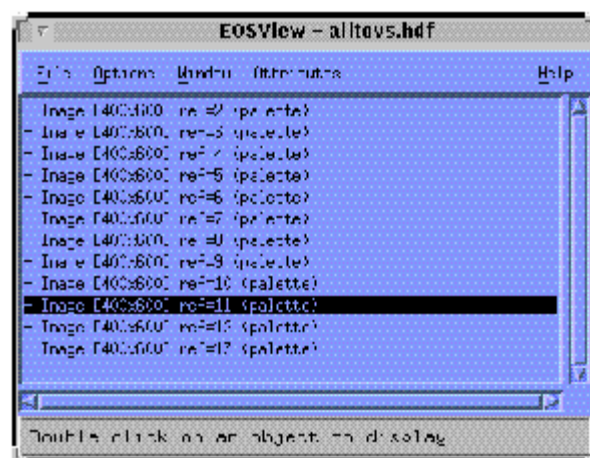

Figure 4-23. File Contents Display Window

If you double click on a Raster Image Group, the image to be drawn in an EOSView -Image Display Window. A Raster image is different than the pseudo-color display since this image is not drawn from data. It is simply a visual depiction of an object. The menus and buttons for this window are similar to those described for the pseudo-color display.
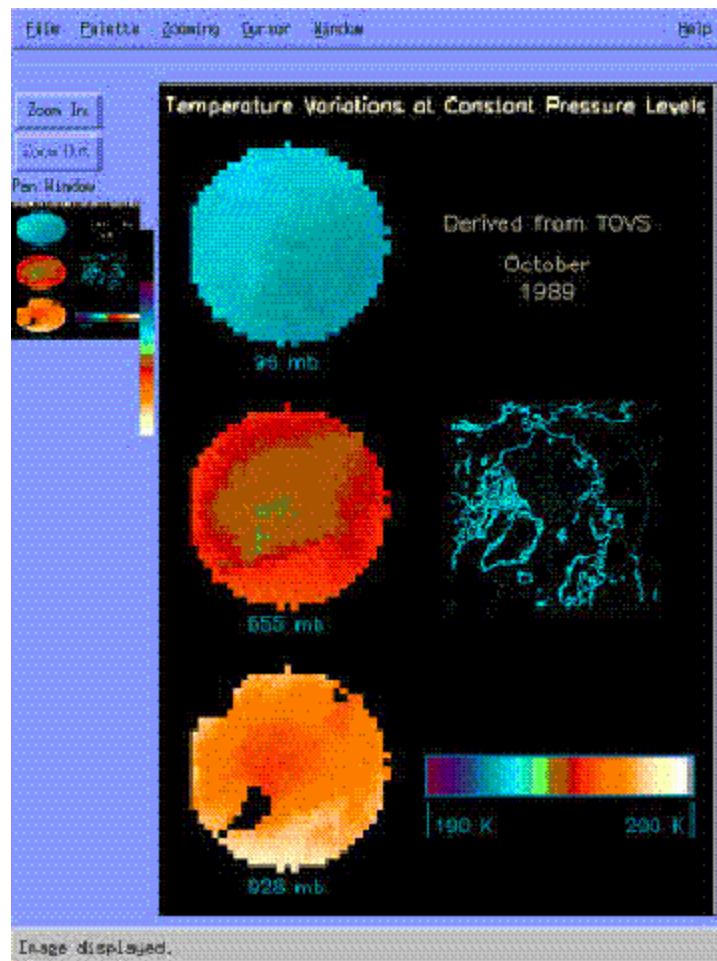

Figure 4-24. Image Display Window

4.9.10 Grid Select GUI

If you select an HDF file containing an grid file object in the File Selection dialog, you'll bring up a File Contents Display Window like the one below.
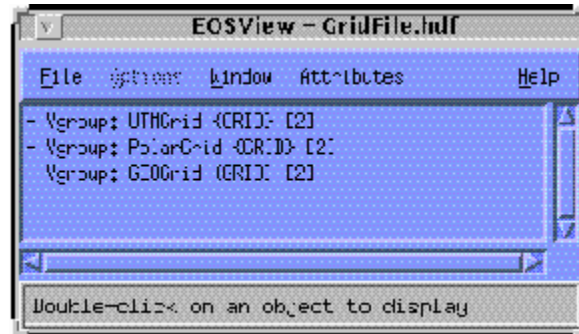

Figure 4-25. File Contents Display Window

If you double click on a selection (in this case, the object Vgroup: UTMGrid {GRID} [2] was selected) you will bring up the Grid Select GUI.
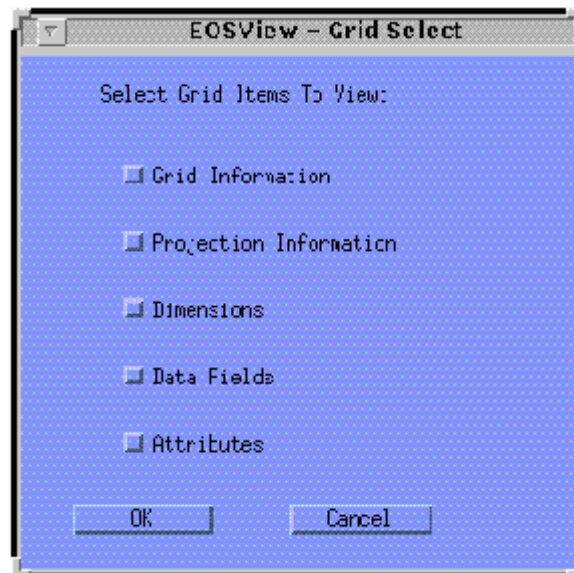

Figure 4-26. Grid Select GUI

All the following options are available for selection:

- Grid Information

- Projection Information, Dimensions

- Data Fields

- Attributes

Selecting OK will bring up windows for all the items selected. Clicking on Cancel will return you to FileContents Window.

4.9.11 Grid Information Dialog

Click on the Grid Information checkbox in the EOSView - Grid Select window to view the summary of a selected Grid object and press the OK button.. The Grid Information dialog displays information about the selected grid such as X-Dimension value, Y-Dimension value, Upper Left Point values, and Lower Right Point values.
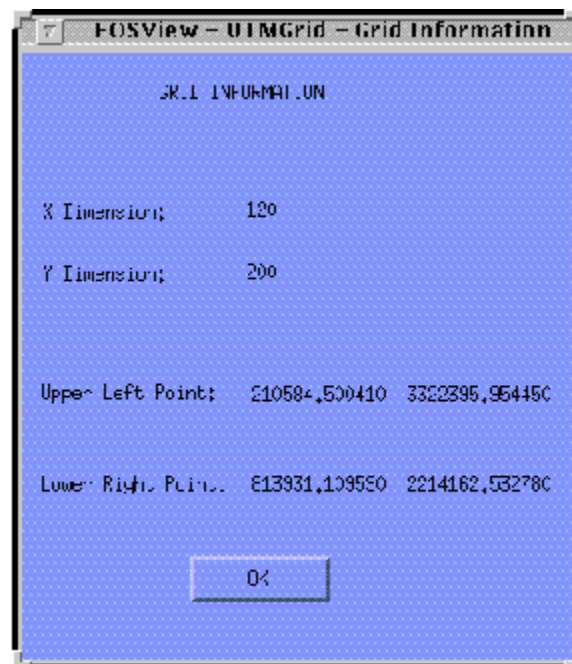

Figure 4-27. Grid Information Dialog

Click OK to close the window.

4.9.12 Projection Information Dialog

Click on the Projection Information in the EOSView - Grid Select window to view the Projection Information of the selected Grid object, and press the OK button. The EOSView - Grid Projection Information window will appear.
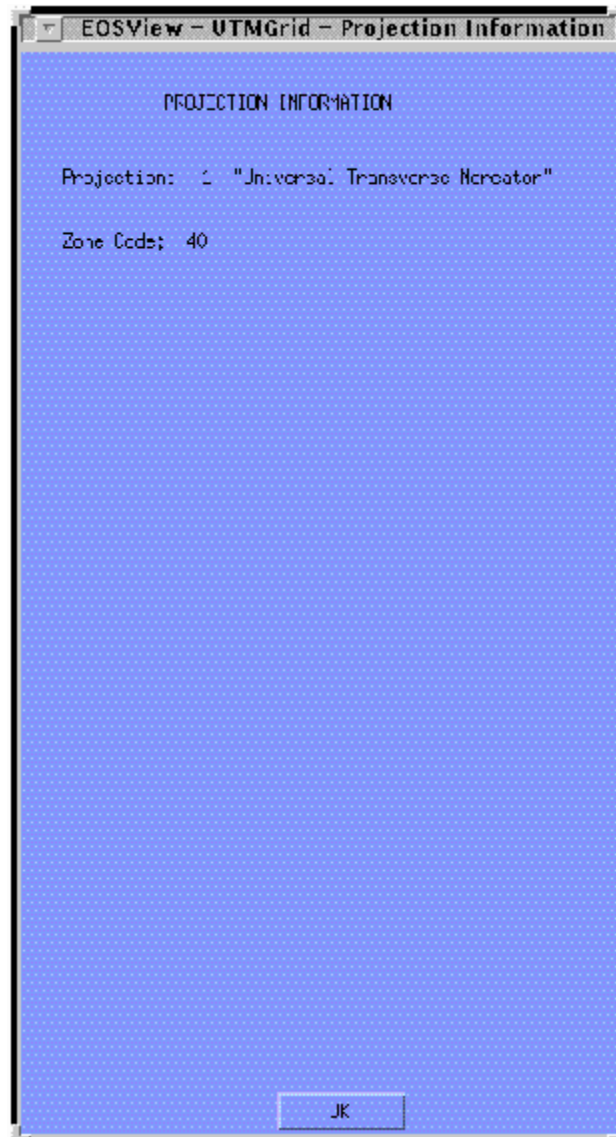

Figure 4-28. Projection Information

The Projection Information window displays information about the projection of the selected grid in a dialog box. The first item displayed is the Projection itself. If the projection is Universal Transverse Mercator, the next item is displayed is the Zone Code. For any other projection, the next items displayed are the thirteen (13) Projection Parameters.

Click OK to close the window.

4.9.13 Dimensions

Click on the Dimensions in the EOSView - Grid Select window to view the dimensions of the selected Grid object, and press the OK button. The EOSView - Grid Dimensions window will appear.
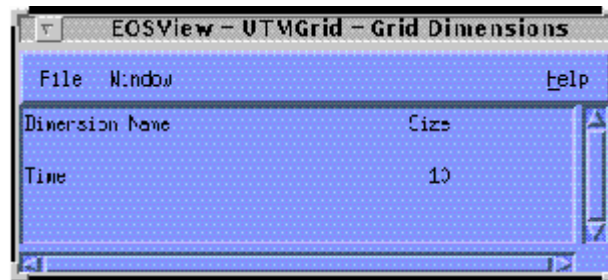

Figure 4-29. Grid Dimensions Window

This window lists Dimension Names and Sizes for the selected Grid in table form in a scrollable window. The items listed are non-selectable and are for display/verification purposes only.

Click File > Close Window to close the window.

4.9.14 Data Fields

Click on the Data Fields in the EOSView - Grid Select window to view the dimensions of the selected Grid object, and press the OK button. The EOSView - Grid Data Fields will appear.
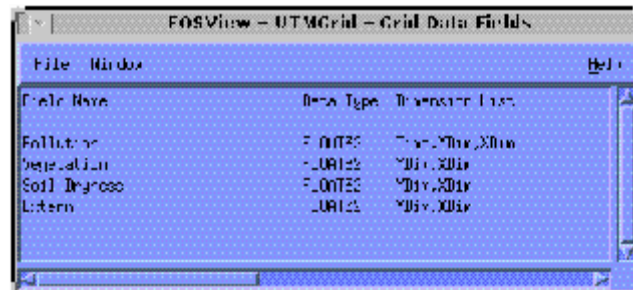

Figure 4-30. Grid Data Fields Window

To view a slice of the Grid Geolocation Data Field data, move the pointer over the object and double click the left mouse button. This will cause the EOSView - Start/Stride/Edge window to appear.
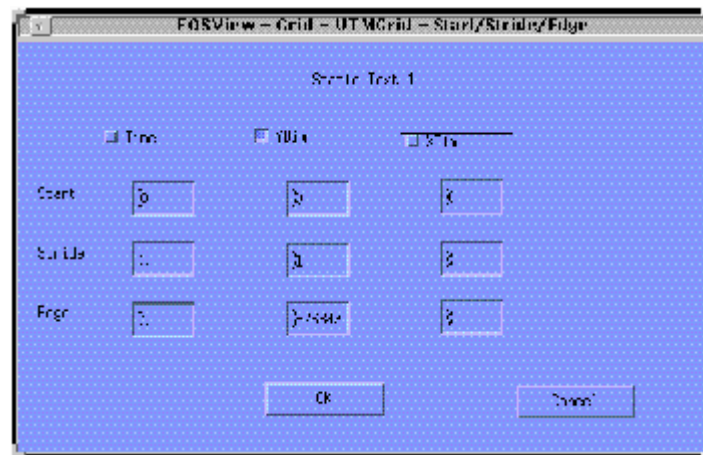

Figure 4-31. Start/Stride/Edge Window

This window lists the Start, Stride, and Edge values for each dimension listed (up to eight). The start value for each dimension may be edited, but the stride and edge values may only be edited for the selected dimensions. (This is a way of subsampling the data desired.)

A dimension may be selected by clicking on the check box next to the dimension name. A maximum of two dimensions may be selected since only a two dimensional table can be displayed.

Click on OK once you've entered the desired data. The selected dimension data will be displayed in the EOSView -Grid Table. Go to any of the following for more information on Vdata (Table), building a pseudo-color image, and the Min/Max Values Window.

Click on Cancel to cancel all actions.

Note that if an input error occurs, a warning dialog will appear, displaying the dimension name that is in error and a size total. You must meet the criteria in the formula displayed in the warning dialog.
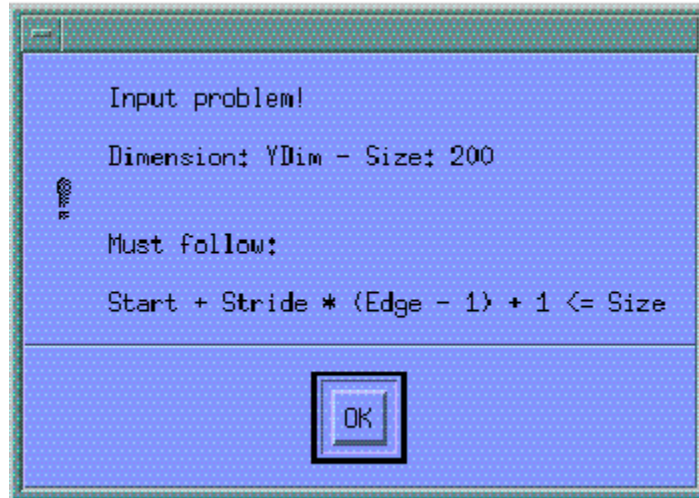
Figure 4-32. Warning Dialog

Click on OK to return to the Start/Stride/Edge Window to re-enter the correct values.

4.9.15 Attributes

Click on the Attributes in the EOSView - Grid Select window to view the dimensions of the selected Grid object, and press the OK button. The EOSView - Grid Data Fields will appear.
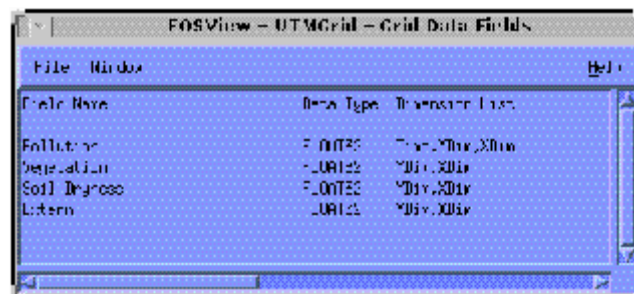

Figure 4-33. Grid Select Window

To view a slice of the Grid Geolocation Data Field data, move the pointer over the object and double click the left mouse button. This will cause the Attributes Text Display to appear.
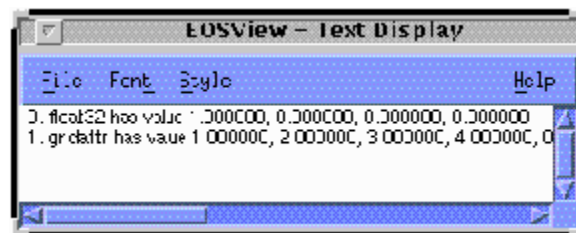
Figure 4-34. Attributes Text Display

This display shows the attributes associated with a particular dataset. Text can be modified using the Font and Style pulldown menus, and additional help can be obtained from the Help pulldown menu.

Click File > Close Window to close the window.

4.9.16 Swath Select GUI

If you select an HDF file containing a VGroup object containing swath data in the File Selection dialog, you'll bring up a File Contents Display Window like the one below.
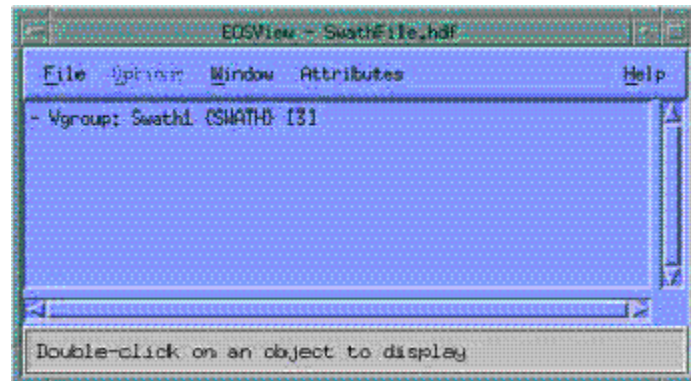
Figure 4-35. File Contents Display Window

If you double click on an item in the File Select window, you'll bring up the Swath Select Window.

Figure 4-36. Swath Select Window

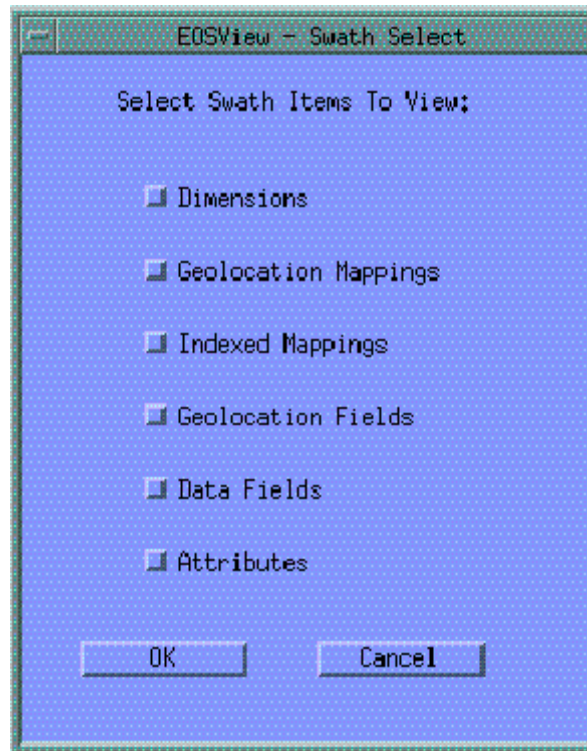Choose as many options as you desire from the following list:

- Dimensions

- Geolocation Mappings

- Indexed Mappings

- Geolocation Fields

- Data Fields

- Attributes

Select OK to bring up windows for any of the items selected.

Click on Cancel to return to the main Swath screen.

4.9.17 Swath Dimensions

Click on the Dimensions in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Geolocations Mappings window will appear. This window lists the Dimension Names and Sizes for the selected Swath in a table form in a scrollable window. The items listed are non-selectable and are for display/verification only.

Click File > Close Window to close the window.

4.9.18 Geolocation Mappings

Click on the Geolocation Mapping in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Geolocations Mappings window will appear. This window lists the Geolocation Dimensions, Data Dimensions, Offsets, and Increments for the selected Swath in a table form in a scrollable window. The items listed are non-selectable and are for display/verification only.
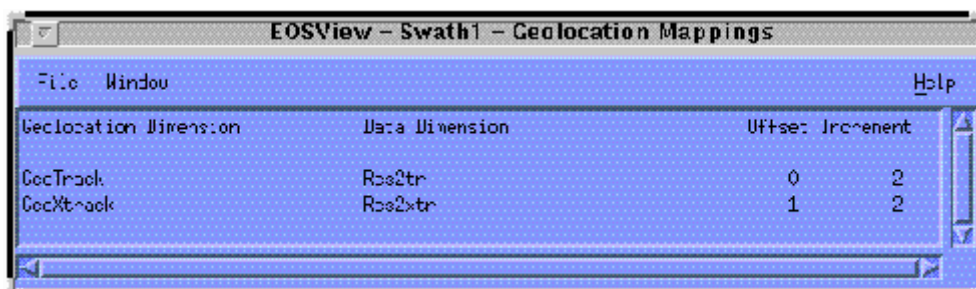

Figure 4-37. Swath Geolocations Mapping Window

Click File > Close Window to close the window.

4.9.19 Indexed Mappings

Click on the Indexed Mapping in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Indexed Mappings window will appear.

Figure 4-38. Swath Indexed Mappings Window

To view the size of the mapping, move the pointer over the object and double click the left mouse button. The EOSView - Indexed Mapping Sizes window will appear.
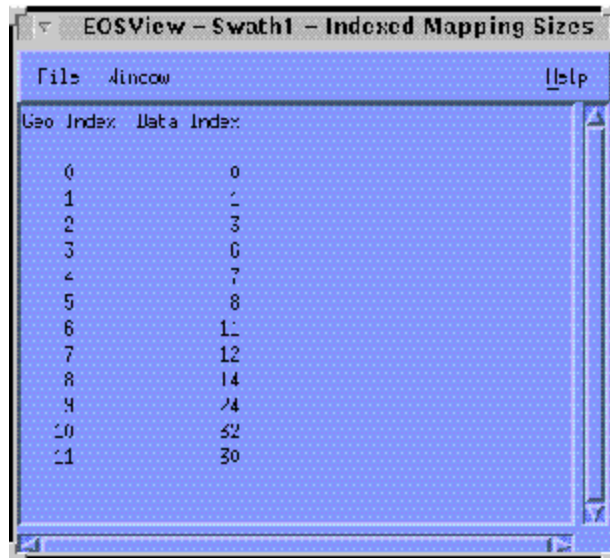
Figure 4-39. Indexed Mapping Sizes Window

This window lists the Geolocation Indices and Data Indices for the selected Swath in a table form in a scrollable window. The items listed are non-selectable and are for display/verification purposes only.

Click File > Close Window to close the window.

4.9.20 Geolocation Fields

Click on the Geolocation Fields in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Geolocation Fields window will appear. To view a slice of the data, select a Swath Geolocation by moving the pointer over the object and double clicking the left mouse button. This will cause the EOSView - Start/Stride/Edge window to appear. This window lists the Start, Stride, and Edge values for each dimension listed.
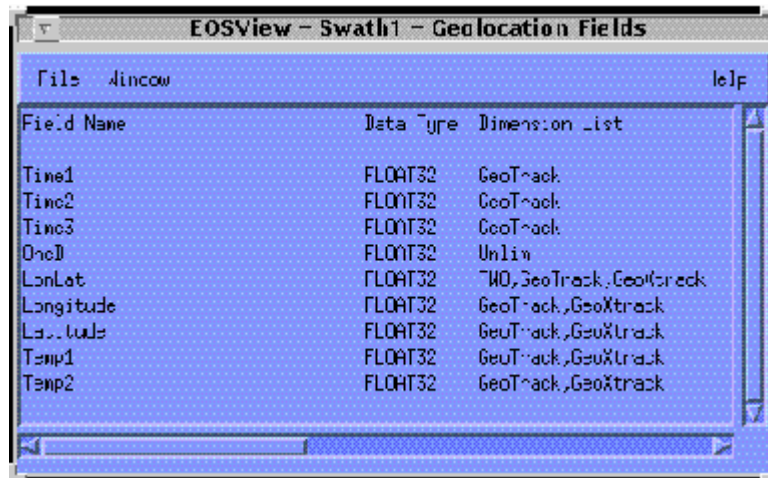
Figure 4-40. Swath Geolocation Fields Window

Click File > Close Window to close the window.

4.9.21 Data Fields

Click on the Data Fields in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Data Fields window will appear.

4.9.22 Attributes

Click on the Attributes in the EOSView - Swath Select window to view the dimensions of the selected Swath object, and press the OK button. The EOSView - Swath Attributes window will appear.

4.9.23 Point Select GUI

If you select an HDF file containing a VGroup object containing point data in the File Selection dialog, you'll bring up a File Contents Display Window like the one below.
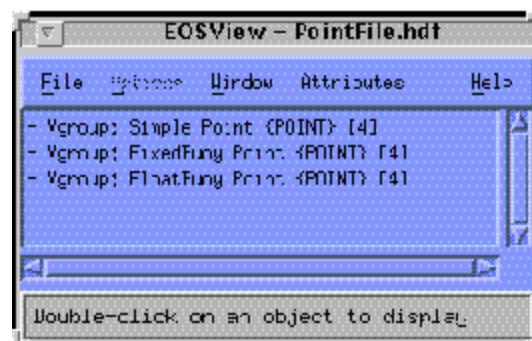
Figure 4-41. File Contents Display Window

In this example, selecting the Vgroup: FloatBuoy Point {POINT} [4] object brings up the Level Information Window.
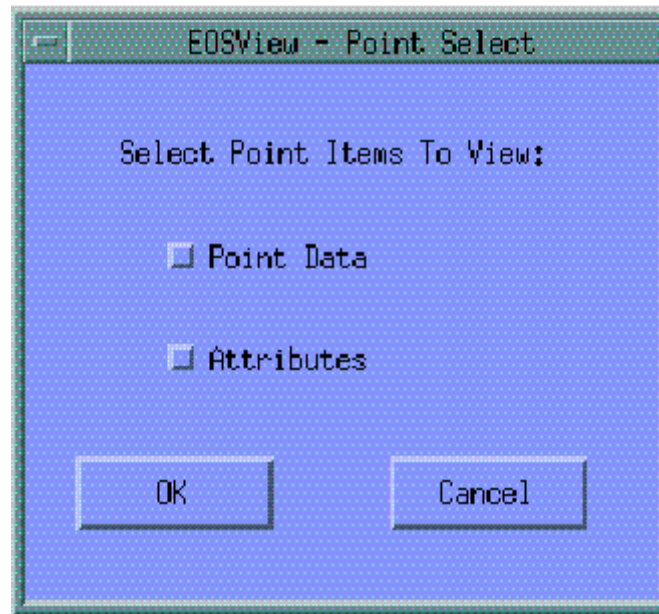
Figure 4-42. Level Information Window

Click on OK to bring up the corresponding window for the options selected, either Point Data or Attributes.

Click on Cancel to return to the main Point screen.
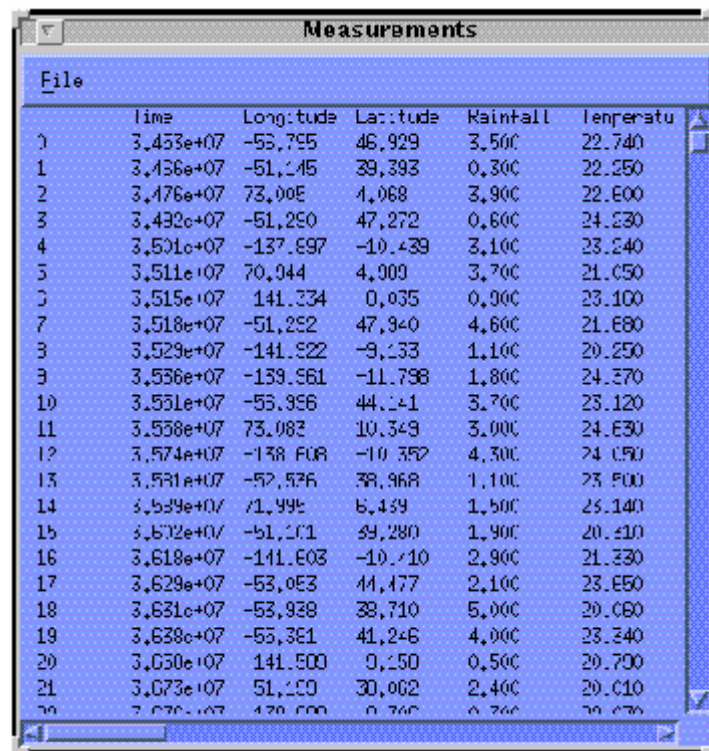
If both items are selected, the following screen appears.

Double-click on any Level Name to bring up a Table, such as the Measurements Table.

Figure 4-43. Level Name Screen

The data in this table can be graphically depicted by selecting Plot from the File pulldown menu.

Figure 4-44. Measurements Table

Note: This has changed based on the new Vdata interface. The User's Guide will be updated at a later date.

4.9.24 Pulldown Menus GUI

The File Contents Displays all have a common pulldown menu structure with the following options:

- File

- Options

- Window

- Attributes

- Help

4.9.24.1 File Pulldown Menu

The File pulldown menu contains options for

- File Info

- Close

The File Info pulldown menu selection allows the operator to bring up information on the number of Raster Image groups, scientific data groups, palettes, Vgroups, LoneVdata, and annotations in the form of a File Information dialog.
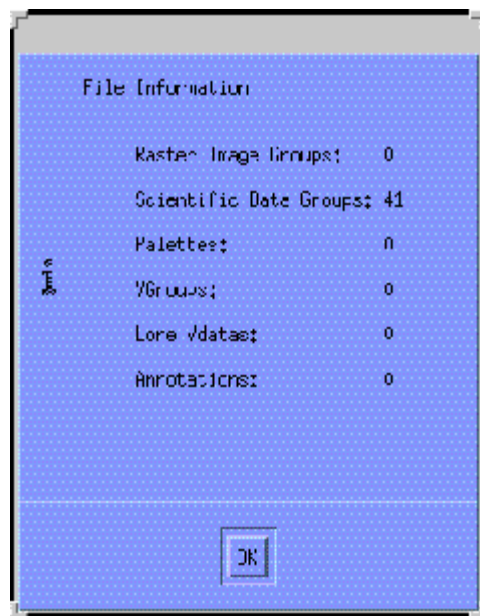
Figure 4-45. File Info Pulldown Menu

Click on OK to return to the File Contents Window for the HDF file.

4.9.24.2 Options Pulldown Menu

The Options pulldown menu and its Animate images selection becomes sensitized when the selected file contains multiple Raster Image Groups. This will cause all the images to be lined up and displayed in order in an EOSView - Animation Window, with different frames of an actual animation shown (skull.hdf file).

Frame 1 of 40   Frame 4 of 40   Frame 10 of 40

Frame 22 of 40   Frame 29 of 40   Frame 37 of 40
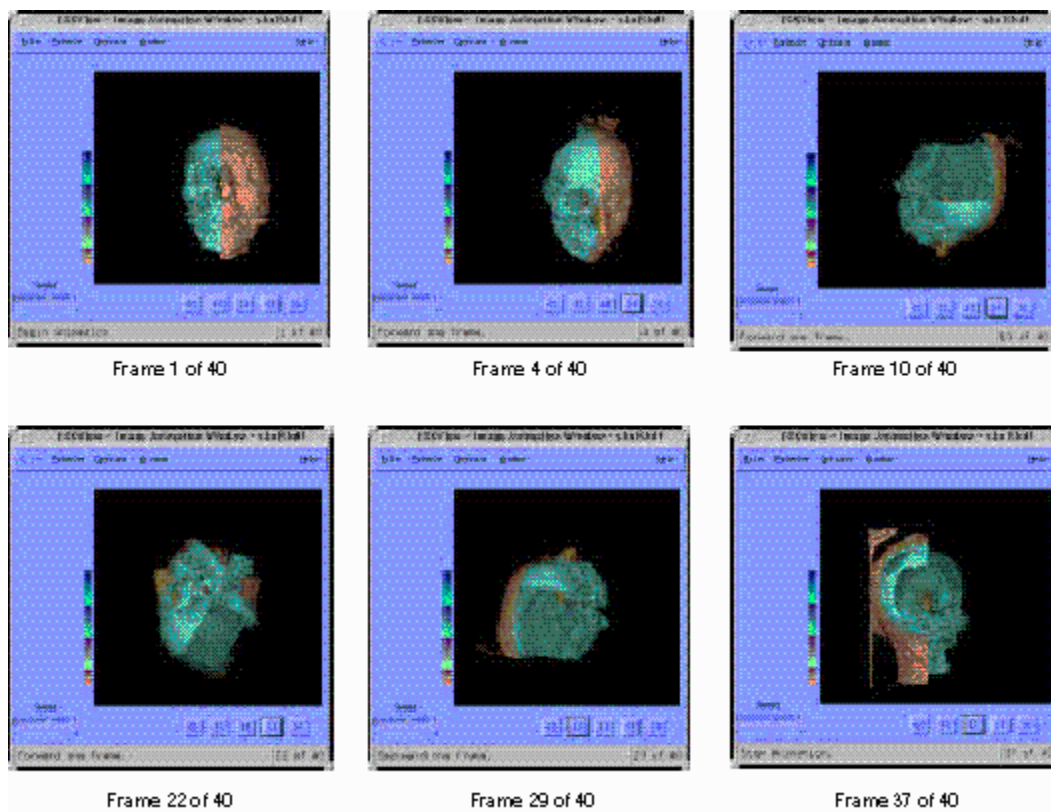
Figure 4-46. Animation Window

The Animation Window has the following features:

- Closing Animation Window - closes the animation window.

- Palette

- Modes -- Select among the 3 modes of animation from the Options - Modes options of theanimation window menu bar.

  - "Stop at end" will display the images until the last image or first image is displayed. This   is based upon the direction selected for animation.

  - "Continuous run" causes the animation to go in an endless loop in the direction selected until the stop button is pressed.

  - "Bounce" causes the animation to run back and forth in forward and reverse order until the stop button is pressed.

- Speed Control -- The speed control slider adjusts the speed of the animation to the desired speed. Moving the slider in the "+" direction increases the animation speed while moving the slider in the "-" direction causes the animation to decrease in speed.

- Window

- Help

- Start/Stop Buttons -- The five Start/Stop Buttons centered underneath the animation image are labeled "<<" "|<" "||" ">|" and ">>".

    – "<<" causes the animation to begin in reverse direction.

    – "|<" causes the animation image to decrease by one frame.

    – "||" stops the animation.

    – ">|" cause the animation image to increase by one frame.

    – ">>" causes the animation to begin in forward direction.

The buttons are controlled by selecting the Modes option on the menu bar.

4.9.24.3 Window Pulldown Menu

The Window pulldown menu lists all windows currently open. Any window selected from this list will be moved to the top.
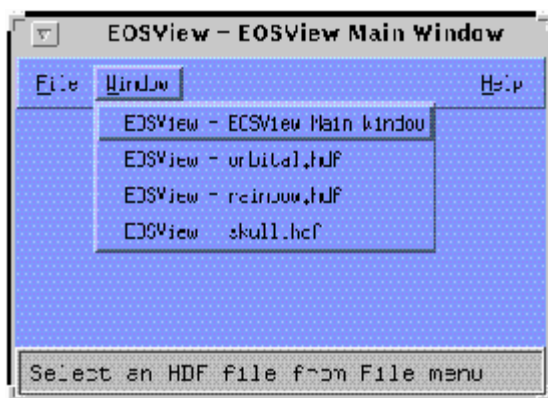
Figure 4-47. Window Pulldown Menu

The Window pulldown menu provides the same function on all other screens on which it appears.

4.9.24.4 Attributes Pulldown Menu

The Attributes option contains one pulldown menu item "Global...." that brings up a text file window with a list of attributes (e.g., parameters, values, version numbers) for the entire file or brings up a dialog stating that there are no attributes available.)
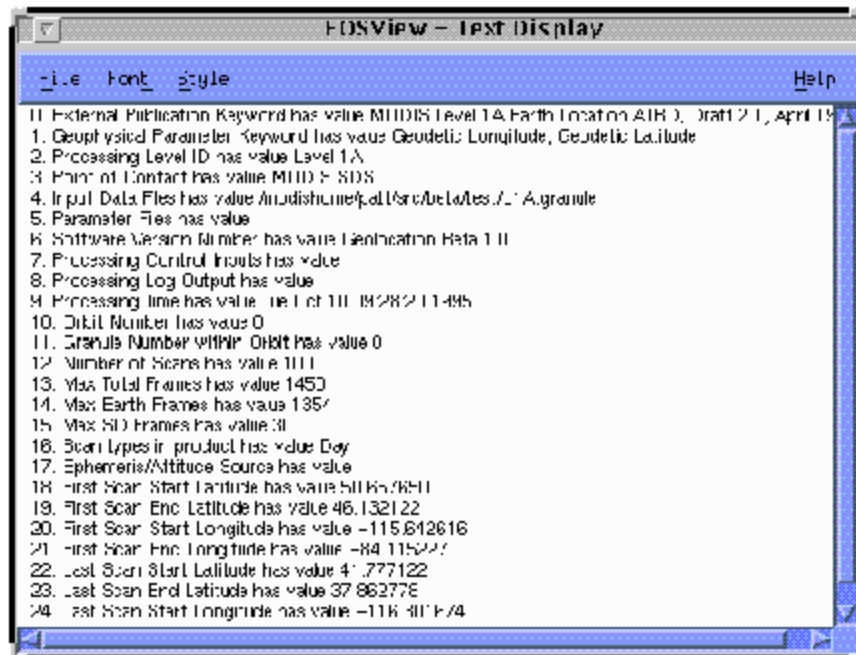
Figure 4-48. Text Window

From the text window, you can use the pulldown menus as follows:

− File - exit the window

− Font - select from a list of fonts (e.g., courier, Helvetica). A box showing what the text looks like based on choosing the other selection is provided.

− Style - select from a list of styles (e.g., normal, bold, italic) and point sizes (e.g., 8 pt, 10 pt.)

− Help

4.9.24.5 Help Pulldown Menu

The Help option contains a pulldown menu for context, help, window, keys, contents, index, and version.

Help On Context - turns the mouse pointer into a ? that can be clicked on an area of interest, bringing up help text for that item.

Help On Help - shows how to use the EOSView online help feature to show how to navigate through the Help system using the online hypertext system.
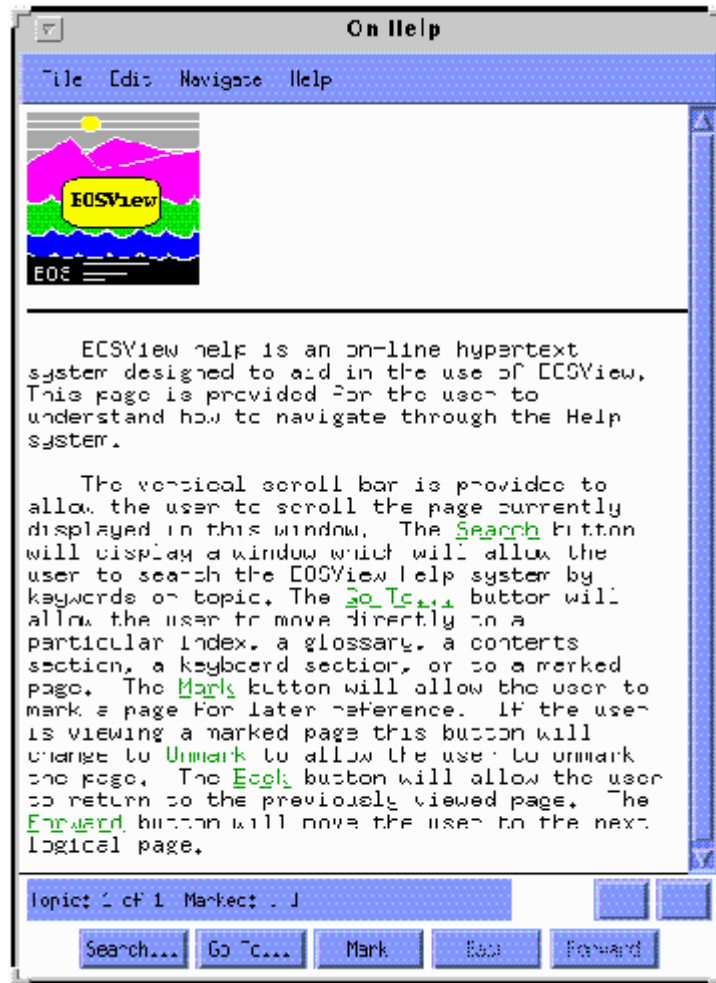
Figure 4-49. Help Window

- File - allows you to exit the On Help window. Print and Print Setup are not available.

- Edit - allows you to Copy, Copy Part of a Topic, or Copy as Wrapped.

- Navigate - allows you to search for a topic, go to a specified topic, bookmark items of interest, go forward and back to a topic (these items are available in the form of pushbuttons at the bottom of the screen), and view a previous or next topic.

- Help - provides help on how to use help and "about help" (not functional). The On Help window provides the following pushbuttons:

  - The "Search..." button provides a way to search the EOSView Help system in one of two ways. You may select to search by Topic and a list of topics will be displayed to choose from, or you may select search by Keyword and you will be presented with a list of keywords (not functional). from which to choose. The "Go To..." button allows you to move to one of five topics:

1. Index - the help described in the Help - Index selection from the menu bar.

2. Glossary - a defined glossary of selectable terms common to EOSView.

3. The help described in the Help - Contents selection from the menu bar.

4. The help described in the Help - On Keys selection from the menu bar.

5. Any marked page.

− The "Mark" button allows you to mark a page. Once the page is marked, it appears in a list box in the "Topic Go to Dialog" box. The marked page may then be selected and immediately recalled. The "Mark" button will appear as "Unmark" when viewing a marked page.

− The "Unmark" button allows you to unmark a marked page. If the you are currently viewing a marked page, an "X" appears in the check box labeled "Marked:." Pressing the "Unmark" button will cause the "X" to disappear and the page will not appear in the list box of the "Topic Go to Dialog."

− The "Back" button will return you to the previously viewed page. Think of the help system as a book. The back button will only appear sensitized if the previously viewed page would be logically backward from the point of current view.

− The "Forward" button will move you to the last forward page viewed. Think of the help system as a book. The forward button will only appear sensitized if the previously viewed page would have a page number greater than the page being currently viewed.

Help On Window

The Help On Window is the same as the Help On Index Window shown below.

Help On Keys

When you select Help On Keys from the Help pulldown menu, the following message appears in a Keys Window: "EOSView uses no special keys to traverse through the program. To navigate through EOSView simply use the mouse and click on the options that are desired."

Help On Contents

The Help On Contents window tells you that EOSView is a tool written to assist users view the contents of HDF files and that it is capable of displaying the contents of files containing HDF-EOS data. More help can be obtained by selecting the topic desired.
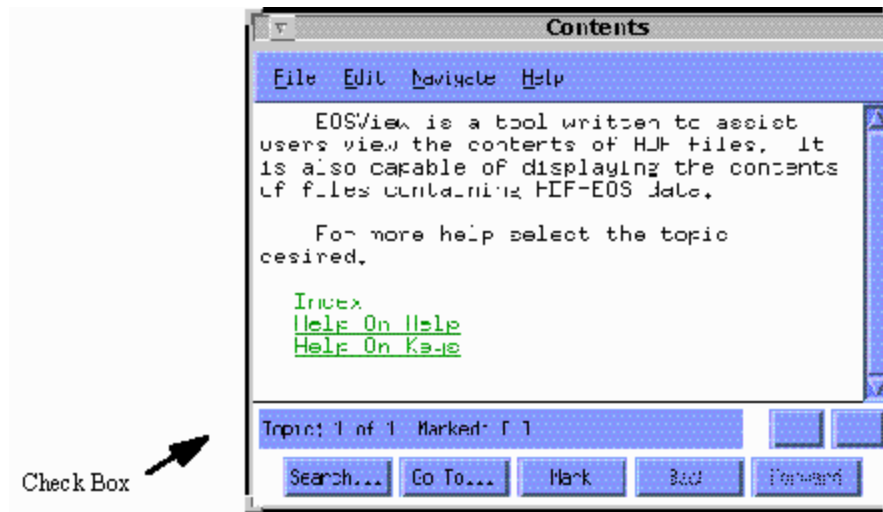
Figure 4-50. Help on Contents Window

Help On Index

Select Help On Index to bring up the Index window. This window presents a list of each EOSView window and a list of hypertext help items.
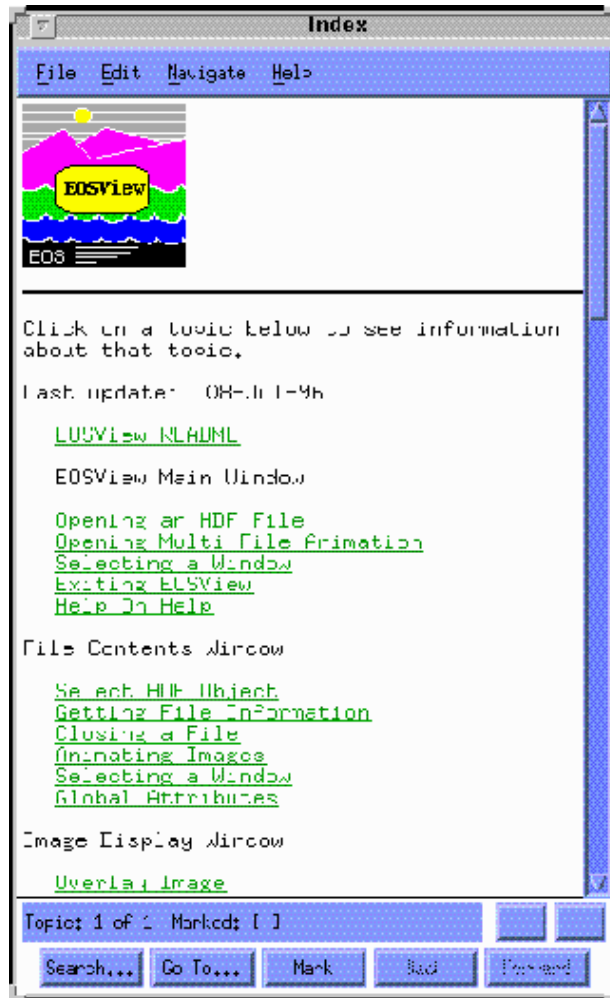
Figure 4-51. Index Window

Help On Version

Select Help On Version from the Help pulldown menu to bring up the dialog.
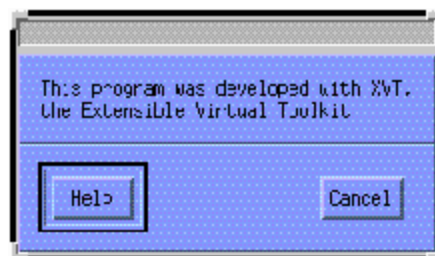
Figure 4-52. Help on Version Window

Click on the Help button to go to the Help on Contents screen.

Click on Cancel to close the dialog.

5. Command and Key Definitions/Descriptions

The table that follows provides a quick list of features for the desktop.

Table 5-1.   Quick List of Features

Command	Action
File > Create Directory	To create a directory
File > Create Directory	To go to your home directory
File > Go Up	To go up just one directory
Selected > Open	To open applications
Selected > Open New Window	To open an additional window
File > Close Window	To close the display window of the last directory you visited; also to close a duplicate window
Selected > Move To	To move or rename a highlighted application or directory
Selected > Copy To	To make another copy of an application or directory
Selected > Delete	To delete an application or directory
Selected > Undelete	To restore only the last object you deleted
View > Duplicate Window	To open a duplicate Desktop display window
Desktop View > Refresh	To refresh your display
Tools > ECS Data Handling System (EDHS)	To access the Web-based searchable technical document server
File > Exit	To exit the Desktop

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6. Putting It All Together: Tutorial and Scenarios

The EOSDIS B0SOT User's Manual - System Tutorial provides a walk though the EOSDIS B0 Search and Order Tool (B0SOT), including examples of screens and command sequences; also included are guidance and suggestions for using EOSView and the Earth Science Online Directory optimally in conjunction with B0SOT. To fully exercise the system functions across the tools, spend some practice time with the scenarios.

- Data Gathering Scenarios

- EOSDIS B0SOT User's Manual - System Tutorial

Data Gathering Scenarios

The scenarios that follow are intended to give you an opportunity to successfully exercise the tools available in EOSDIS Version 1. First, you'll want to log into the Desktop to become familiar with the available tools and the pop-up menu structure. Then, in scenario 1, you may wish to start with a search of the B0SOT, setting parameters within the tool (e.g., spatial, temporal) to retrieve data appropriate to your needs. You may then view your data through B0SOT's browse function before ordering. Or you may order the data in Hierarchical Data Format (HDF) and view it later through EOSView. Yet another possibility is to search the Earth Science Online Directory (ESOD) for existing collections of data that may have been "advertised" by colleagues or other users within ESOD. The Data Acquisition Request (DAR) Tool is for authorized users only, so no scenario for DAR has been included here.

Practice Scenarios

1. Imagine you are a Scientist looking at correlations between landuse patterns, vegetation, and water use for the Eastern US. Today you have accessed EOSDIS Version to look for satellite data that contains information about changes in vegetation during the 1992 growing season for the Eastern United States.

2. Imagine you are a Scientist interested in the incidence of fires in Africa and the Amazon from 2000 to 2002.

EOSDIS B0SOT User's Manual- System Tutorial

The major part of this tutorial guides you through the EOSDIS B0 Search and Order Tool. Additionally, guidance and suggestions for using the associated tools, the Earth Science Online Directory (ESOD) and EOSView, are included to provide hints and tips about the best ways to access, obtain, and view ECS data.

1. Your first step is to access and log into the IMS. You may access the B0 IMS by telnet to any one of the following Internet addresses. If you choose to open your telnet session through Netscape, be sure to have the appropriate telnet application selected as a helper. To do this in Netscape:

   - Go to Options -> General Preferences ->Apps -> Telnet

   - Applications.

   - Click on Browse to selected the appropriate application

   - location or type it in.

   - Click OK; then click Reload.

     – telnet eosims.asf.alaska.edu 12345 connects to Alaska SAR Facility

     – telnet eosims.cr.usgs.gov 12345 connects to EROS Data Center

     – telnet eosims.gsfc.nasa.gov 12345 connects to Goddard Space Flight Center

     – telnet eosims.jpl.nasa.gov 12345 connects to Jet Propulsion Laboratory

     – telnet eosims.larc.nasa.gov 12345 connects to Langley Research Center

     – telnet eosims.msfc.nasa.gov 12345 connects to Marshal Space Flight Center

     – telnet eosims.saa.noaa.gov 12345 connects to NOAA-Satellite Active Archive

     – telnet eosims.colorado.edu 12345 connects to National Snow & Ice Data Center

     – telnet eosims.esd.ornl.gov 12345 connects to Oak Ridge National Laboratory

Note: If you are connecting from a VMS machine, the command format is telnet/port=12345 eosims.cr.usgs.gov, where the machine name changes as appropriate.

2. Follow the instructions on the screen once you're connected.

3. The Welcome screen appears first. If you need to reposition the screen, position the cursor on the screen title bar, press the mouse button down, move the screen to the desired location, and release the mouse button.

Note: The data on the screen may differ than that in this tutorial due to changes in the contents of the databases at each of the Data Centers. Click on the thumbnails to get the full size graphics.

4. The Welcome screen comprises pull down menus at the top of the screen, a scrollable display area in the middle of the screen, and buttons at the bottom of the screen.

5.	The pull down menus at the top of the screen are present on most of the IMS screens. The Go To and Help pull down menus will always show the same options. However, depending upon the current screen or current selections, some items may be inactive. Items that are inactive are grayed out, and the system will not allow you to make an invalid selection.

Menu options:

Go To menu option is for "going to" other parts of the system (e.g., search screen, inventory, directory, browse, detail information, coverage map, order data, status, user profile, comments, welcome, and exit IMS). Screen Functions menu option is for selecting options applicable to the current screen or function. Help menu option provides access to help. There are nine types available: Select Item, Screen, Commands, Functions, System, Help, Glossary, Acronym List, and User Services Offices.

When you use Select Item, the cursor will change to a question mark. Simply place the cursor on the field in question and click. The system will pop up a window containing help for that field.

1.	The display area is a Hyper Text Markup Language (HTML) window containing general information on the system as well as hyperlinks to other important information. Review this area occasionally for updated information or enhancements and helpful hints in using the system.

2.	The buttons at the bottom of the screen are shortcuts for commonly used functions. The first three buttons are used with the HTML display area of the welcome screen.

3.	The Back button displays the previous document in the HTML window display area.

4.	The Forward button displays the next document in the HTML window display area after you've been moving through hyperlinks in the HTML display window area and used the Back command. The Home button will display the original Welcome page in the HTML display window area. The Search Screen button brings up the Search screen allowing users to enter search criteria. The User Profile button brings up the User Profile screen allowing you to enter your user information. The Exit IMS button allows the you to quit the IMS. The Close button allows you to close that particular window, or if no other windows are open, and to exit the IMS.

5.	Click on the User Profile button at the bottom of the Welcome screen. The system will display the User Profile screen.

6.	Enter at least your first and last names, city, country, telephone number, Internet email address, and affiliation category and type in the User Profile. In addition to contact information, there are buttons available to provide separate billing and shipping information. (While most of the data sets are available free of charge, some have associated costs and require billing or other account information.).

7.	Save the Profile by clicking on the Save button. A dialog box will display the message Your User Profile has been saved.

8. Click on the OK button.

9. Click on the Close button, and the system returns you to the Welcome screen.

Setting up the Search

1. To perform a search, go to the Search screen and enter search criteria. Click on the Search Screen button at the bottom of the Welcome screen. You could also use the GoTo menu and select Search Screen.

2. Some of the fields have bottom and right scroll bars to scroll up, down, left, and right. Use the select (left) mouse button to change the view by moving the slider up and down (or side to side) in the scroll area or by pressing one of the scroll arrows.

3. Select Search Type by clicking on the diamond to the left of the Search Type name. The default is Inventory. For an explanation of the different types of searches, use Help for Selected Item and then click on the search type, or see Section 4.0 of the EOSDIS IMS User's Manual for a detailed description.

4. You may manually type information into a field. Use the mouse to move the cursor to the appropriate field and click the select (left) mouse button. (This will create a bold border around that box.) Then type the valid information into that field.

5. You may not know what values could or should be entered into certain fields or may not wish to type in a long list. The IMS provides lists of valid values for selected fields on the search screen. Those fields have a List button to the right. Click on that List button, and the system will pop up the appropriate Valids List for that field.

6. For this tutorial the Parameters to be used will be Brightness, Temperature, Ozone, and Total Sea Ice Concentration.

7. Bring up the Valids List for Parameter by clicking on the List button to the right of the Parameter display area.

8. To select values for a given field from the valids list, click on the item in the display area on the left side of the Valids window, then click on the Add button. The value will be shown in the display area on the right side of the Valids window. For more detailed instructions, see Section 4.3.1 of the EOSDIS IMS User's Manual, Valids Lists.

9. Make your desired selection(s), and click on the OK button to return to the Search screen.

10. Click on the Cancel button to return to the search screen without retaining any of the displayed valids for selection.

11. Do the same for the Data Set field. The input is NIMBUS-7 SMMR Sea Ice Concentration Grids for the Polar Regions, SRB Monthly, and SSM/I Wentz Antenna Temperatures from DMSP F8.

12. Choose a geographic area by moving the cursor to the upper right hand area of the screen and placing it on the Geographic area selection box. Press and hold down the mouse button to display the different options for specifying a Geographic area.

13. Choose Global Search and release the mouse button. The coordinates will be loaded and displayed in the Geographic area of the Search screen.

14. Next, change the Number of Granules returned per Data set from 100 to 10.

15. To save the search criteria, click the Save Search button at the bottom middle of the screen. The system will pop up a window for entering the search name. Click on the input field at the bottom of the Save Search Criteria window and type in: Tutorial

16. Click on the Save button to save the name; then the system returns you to the Search screen. The new name of the search will appear at the top left corner of the Search screen.

Executing the Search

1. To execute the Search click on the Execute Search button at the bottom of the Search screen. The system will display a Communications Status screen.

2. Here the search message is going out to all of the data centers that hold relevant data or that were specified in the search. This screen provides a visual display of the communications as they occur.

Table. 6-1.   Explanation of Status Block

First column	Open Connection	IMS has connected to the DataCenter
Second column	Sending Message	IMS is sending the search request
Third column	Receiving Results	IMS is receiving results sent by the Data Center
Fourth column	Completed Successfully	All information has been received
Fifth column	Abort Search	IMS search at this Data Center has been stopped.
Sixth column	Connection Failed	IMS is unable to reach the Data Center
Seventh column	See Comments	There is a problem with this search for this Data Center, click on the Comments button

Granule Count: the number of granules returned by the search for this Data Center

Table 6-2.   View

Comments	Click on this button, and a dialog box will pop up to explain the problem encountered with this search for this Data Center
Data	Click on this button to view the results of the search

Displaying Inventory Results

1. When all searches are completed, click on the Data button for LaRC. The Inventory Results Screen will appear.

2. From LaRC select a couple of granules for coverage and detailed information, and select one for browse. To do this, select (click on it to highlight) a granule, then go to the Screen Functions menu and choose Mark for.... From the cascading menu, choose Detail. The N in the D column on the right side of the screen will toggle (change) to or you could, instead, click on the N in the D column to toggle it to Y. Do this for Coverage (C column) and Order (O column). Select a few granules for each function. **Note**: Marking the granule for Order only builds the order list; it does not place the order with the data centers.

3. Some granules/data sets are packaged together in groups by the data center. If a Multiple Packages window pops up, select the desired data sets; then click on the OK button. The system will then continue with the marking process.

4. Go to the GoTo menu and choose Detailed Information, and from the cascading menu choose for Granules.

5. The system will display the Detailed Inventory Results screen that shows the detailed information for the selected granule.

6. The Detailed Information option displays detailed information about specific granules. This screen contains the "Additional Information" field, which displays data set specific information that the staff at the particular Data Center deemed important information for you to view in deciding whether or not to request a granule.

7. Click on the Close button to close that window and go back to the Inventory Results screen.

8. Go to the Screen Functions menu and choose Unselect All Granules . There should no longer be any granules that are selected (highlighted).

9. Click on the Next Data Center button at the bottom of the screen. The MSFC granules will now be displayed.

10. Just as with the previous Data Center, mark a few granules for Detailed Information, Coverage, and Order. Also mark a couple for Browse. Here, the N will change to IB (for Integrated Browse) or FB (for FTP Browse).

11. The system provides access to Guide documents containing detailed descriptions about data sets, platforms, sensors, projects, and data centers. Select a granule (click on it to highlight), and go to the GoTo menu and select Guide, then from the cascading menu choose Guide Information for Selected Granule.

12. The system will display the Guide Selection Box. This option allows you to choose only certain types of information you may have an interest in or all the information for a more complete listing.

13. Click on All of Above; then click on the OK button to initiate the Guide search.

14. The system will perform a Guide Search based upon the criteria selected.

15. The IMS uses World Wide Web (WWW) to access many Guide documents at the different Data Centers. WWW is primarily a tool for working with text. Its original goal was to enable information-sharing among groups of people at distributed sites by merging the techniques of hypertext, information retrieval, and wide-area networking.

16. The IMS incorporates part of NCSA Mosaic to display the Guide information. NCSA Mosaic for the X window System is a networked information discovery, retrieval, and collaboration tool, as well as a WWW browser. It provides a consistent and easy-to-use hypertext-based interface into a wide variety of information sources.

17. The system will display the Guide Display screen.

18. The first results contain a list of document titles preceded by a score. The score is normalized to 1000, where 1000 is the highest score. A high score means that the document came close to matching the search criteria.

Viewing the Search Results

1. From the document list, click on the document name to view that document. This will bring up a guide document.

2. Click on a document name, and the system will display the chosen document.

3. Within most documents are hyperlinks to other documents. These hyperlinks are indicated by highlighted words within the document. Inter-document hyperlinks are attached to section headers, guide objects, and explicit references. Explicit references are references within the text to other documents, illustrations, charts, tables, etc. By clicking on these words, the system will display the associated document.

4. To return to the previous document (or screen), click on the Back button at the bottom of the screen.

5. When you're finished, click on the Close button to close the window.

6. The system will return the user to the Inventory Results screen.

7. Go to the GoTo menu and select Directory, then select Data Set Information for Selected Granules.

8. The system will perform a Directory search, and a Communication Status screen will be displayed, just as with the Inventory Search. Once the search has completed, click on the Data button to view the Directory search results. The Directory Results screen will be displayed.

9. Click on the Count button to select the data set, and then click on the Detail Directory button at the bottom of the screen to see the Detail Directory information. This information comes from the Global Change Master Directory.

10. Click on the Close button at the bottom of the screen to close the Detail Directory Information screen. Click on the Close button at the bottom of the Directory Results screen to close it. Click on the Close button at the bottom of the Communication Status screen to close it. The Inventory Results screen will be displayed.

11. Click on the Next Data Center button. Select one granule and mark it for Coverage.

12. Click on the granule to highlight it. It is now "selected." To "mark" the granule for Coverage, click on the N in the C column on the right side of the screen. The N will change (or toggle) to a Y. It is possible to mark the granule without selecting it.

Using the Coverage Map

1. Go to the GoTo menu and select Coverage Map.

2. The Coverage Map provides a two-dimensional graphical representation of the geographic coverage of selected inventory granules. You can optionally plot a lat/lon grid on the map at a chosen grid interval. Users can also

   - Pan (or "spin") the globe in a north, south, east, or westdirection at increments

   - Zoom in or out

   - Select from coastline, political boundaries, and river/lake map layers

   - Sequentially cycle through and display the granules that are marked for coverage from the IMS Inventory Results screen, one at a time

   - Mark, "Retain Granule Current Coverage," a granule to remain displayed on the map while stepping through the granules

For any granule displayed on the map, choose to mark a granule for order. (Again, marking for order does not automatically place the order at the data center.)

3. Click on the Next Granule button to view the Coverage Maps for each of the granules that had been marked for Coverage.

4. Click on the Close button to close this window and return to the Inventory Results screen.

5. Go to the Screen Functions menu and select Previous; then from the cascading menu choose Data Center. Click on the Previous Data Center button at the bottom of the screen. The results from LARC should now be displayed.

6. Click on the second granule to "select" it, and then click on the N to toggle the mark for Browse from N to IB. Go to the GoTo menu and select Browse.

7. A Browse Request Communications Status screen will appear. When all the requests have completed successfully, click on the Image button on the right side of the screen.

8. The system will display the Integrated Browse screen containing the browse image.

Browsing the Selection

1. With this function you can locate and retrieve browse products for selected IMS data sets without using special graphics software.

2. This feature allows you to look at the product(s) with the palette that was sent with the product, pan and zoom the image, and adjust the pan increment. When a regional image is displayed, the screen will also display a small coverage map showing exactly where the image falls on the Earth. You may also see any product metadata and will have the options to mark the granule for order or deletion. Deletion does not really delete the granule. It hides the granule from view. You can restore the granule to the list.

3. When at the image, select Next Granule to view the other browse images.

4. After looking at the browse images, go to the GoTo menu and select Order Data. This function sends the user to the Order Data screens. It does not automatically place the order at the data centers.

5. Information pertaining to orderable data products will be displayed. A dialog can then be established through the interface with individual Data Centers to make a data order.

Viewing Your Data With EOSView

Alternatively, you can use the EOSView Visualization Tool, a Hierarchical Data format (HDF) browse and display tool, to preview images, tables, and text before you request data. EOSView provides you with the capability to use thumbnail images to

-   Preview corresponding large images

-   Zoom-in on selected areas of the large image

-   Manipulate the palette range or select an alternative color palette

-   View contents of mutiple files imulataneiously

-   Display multidimensional scientific data sets in tabular form

-   Display multi-file scientific data set group as a single entity

-   Display scientific data set attributes and Vgroups and Vdata classes

-   Display Vdata in tabular form

For more information about EOSView, see the A Science User's Guideto the Release B.0 Client, Browsing Data Using EOSView

Ordering Data

1. Click on the granule Package ID and click on the Package Options button. The system will display the Package Selection Options screen.

2. Select a processing option and media type. Click on the OK button and the system will return the user to the Order Data screen.

3. Use the Next Data Set and Next Data Center buttons to work through and select packaging options for all the granules that had been marked for Order.

4. Unless ready to actually order data, do not do the following step. When ready to submit the request, click on the Submit Order button at the bottom of the screen. The order is now being placed at the data centers.

5. The system will display a Communications Status screen, and when the search has completed successfully, the Contact Information will be available. Click on the Contact Info button on the right side of the screen to view the information. When finished, click on the OK button. Click on the Close button on the Communication Status screen

Sending Comments

1. Before concluding the session, please select Comments from the GoTo menu and leave any comments about this system. The system will display the Comments screen.

2. Click on the text area to activate it, and then type in any comments.

3. The Comments function allows you to create comments to send to the IMS system staff. This function accesses a line editor in which you may create a comment, save the comment, and later access it to add further comments by clicking on the Close button. You may access that comment throughout the system.

4. When you've finished entering the comment, click on the Send Comments button.

Exiting IMS

To exit the system, go to the GoTo menu and select Exit IMS. The system will ask for a confirmation. Click on the OK button and the IMS session will be ended.

Using Earth Science Online Directory

You may also search and retrieve data using the Earth Science Online Directory (ESOD), which enables you to advertise data products, software tools, and services through EOSDIS. ESOD also stores similar information about EOSDIS-sponsored data products, tools, and services.

ESOD allows you to submit your own ads or search through the existing database of ads. You may submit an ad by providing the title, description, and other pertinent information; then, it is immediately searchable through ESOD. ESOD permits free text searching on ads as well as advanced metadata searching on dataset advertisements.

To find out how it works, go to the Earth Science Online Directory (ESOD).

7.   Frequently Asked Questions (FAQs)

Questions will be added as they are collected.

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Abbreviations and Acronyms

API	application program interface
CERES	Clouds and Earth Radiant Energy System
DAAC	distributed active archive center
DCW	Digital Chart of the World
DEM	digital elevation model
DTM	digital terrain model
ECR	Earth centered rotating
ECS	EOSDIS Core System
EDC	Earth Resources Observation Systems (EROS) Data Center
EDOS	EOSDIS Data and Operations System
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data and Information System (GSFC Code 505)
FTP	file transfer protocol
GCT	geo-coordinate transformation
GCTP	general cartographic transformation package
GD	grid
GSFC	Goddard Space Flight Center
HDF	hierarchical data format
HITC	Hughes Information Technology Corporation
HTTP	hypertext transport protocol
IDL	interactive data language
JPL	Jet Propulsion Laboratory
LaRC	Langley Research Center
LIS	Lightening Imaging Sensor
MCF	metadata configuration file
MODIS	Moderate-Resolution Imaging Spectroradiometer

MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NCSA	National Center for Supercomputer Applications
netCDF	network common data format
NGDC	National Geophysical Data Center
NMC	National Meteorological Center (NOAA)
ODL	object description language
PT	point
SCF	Science Computing Facility
SDP	science data production
SDPF	science data processing facility
SGI	Silicon Graphics Incorporated
SOM	Space Oblique Mercator
SPSO	Science Processing Support Office
SSM/I	Special Sensor for Microwave/Imaging
SW	swath
TAI	International Atomic Time
TBD	to be determined
TDRSS	Tracking and Data Relay Satellite System
TRMM	Tropical Rainfall Measuring Mission (joint US - Japan)
UARS	Upper Atmosphere Research Satellite
UCAR	University Corporation for Atmospheric Research
URL	universal reference locator
USNO	United States Naval Observatory
UT	universal time
UTC	Coordinated Universal Time
UTCF	universal time correlation factor
UTM	universal transverse mercator
WWW	World Wide Web